

Claims

1. A process for producing calcium compounds containing water of crystallisation, the process being characterized in that

a) by a chemical reaction between an aqueous alkaline solution of sodium aluminate and a solid or dissolved and suspended, respectively, calcium (hydr)oxide in the presence of carbon dioxide or carbonate a precipitate of a mixture of calcium aluminates having the following modular formula is formed:



b) the thus obtained precipitate, in a manner known per se, is separated by sedimentation, dehydrated, optionally washed with water and the thus obtained filter cake is either dried and/or calcined and/or milled,

c) or the filter cake obtained in step (b) in a wet and/or dried form is suspended in water and added with at least one mineral acid and/or at least one salt thereof for forming a calcium aluminatesalt precipitate containing water of crystallisation, the precipitate is separated by sedimentation, dehydrated, optionally washed with water and the thus obtained filter cake is crushed and optionally dried and/or milled.

2. The process according to claim 1, characterized in that as an aqueous alkaline sodium aluminate solution a waste pickling lye is used as obtained by surface-treatment of aluminum metal.

3. The process according to claim 1 or 2, characterized in that an aqueous alkaline sodium aluminate solution and a waste pickling lye, respectively, is

used wherein Na_2O and Al_2O_3 are present in a mole ratio of (1.0 to 10.0):1, preferably of (1.2 to 2.5):1.

4. The process according to at least one of claims 1 to 3, characterized in that in step (a) an aqueous alkaline sodium aluminate solution is used as a starting material and calcium (hydr)oxide is added thereto.

5. The process according to at least one of claims 1 to 3, characterized in that in step (a) calcium (hydr)oxide is used as a starting material and then the aqueous alkaline sodium aluminate solution is added.

6. The process according to claim 4 or 5, characterized in that from 2 to 8 mole of CaO equivalents, preferably from 3 to 5 mole of CaO equivalents, based on 1 mole of Al_2O_3 equivalent, are added.

7. The process according to at least one of claims 1 to 6, characterized in that the precipitation of the precipitate in step (a) is carried out within a reaction time of from 5 to 3000 min, preferably from 60 to 600 min, at a temperature of from 5 to 60°C, preferably from 30 to 50°C.

8. The process according to at least one of claims 1 to 7, characterized in that the calcium aluminatehydrate precipitate in step (b) is mechanically dehydrated, preferably by using a pressure filtration, in particular by using a chamber filter press or a membrane filter press and, alternatively, by using a vacuum belt filter or a centrifuge.

9. The process according to claim 8, characterized in that the dehydrated calcium aluminatehydrate precipitate at a temperature of < 100°C is dried and crushed, preferably milled.

10. The process according to claim 8, characterized in that the dehydrated calcium aluminatehydrate precipitate at a temperature of from 100 to 1300°C,

preferably from 100 to 500°C, is dried and calcined, respectively, and crushed, preferably milled.

11. The process according to at least one of claims 1 to 8, characterized in that the dehydrated and optionally washed filter cake of step (b) is suspended in water and added with at least one mineral acid and/or at least one salt thereof to form an extra white calcium aluminatesalt precipitate containing water of crystallisation, the precipitate optionally being further processed according to claim 9 or 10.

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12. The process according to claim 11, characterized in that as a mineral acid hydrochloric acid, hydrofluoric acid, sulfuric acid, silicic acid and/or carbonic acid and salts thereof, respectively, in particular their alkaline metal salts, alkaline earth metal salts and aluminum salts are used.

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13. The process according to claim 12, characterized in that as a mineral acid a sulfuric acid containing aluminum, preferably a waste acid derived from eloxal plants is used.

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14. The process according to claim 11, characterized in that in step (b) a sulfate is added to the filter cake suspended in water in a ratio of 1 part by weight of Al to 4 to 7 parts by weight of SO_4 , based on the total aluminum content.

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15. The process according to claim 14, characterized in that anions of the further mineral acid(s) mentioned in claim 12 and/or salts thereof are additionally added in amounts of 1 part by weight of Al to 0.5 to 10 parts by weight of anions, based on the total aluminum content of the suspension.

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16. Use of the products obtained in the process according to any of claims 1 to 15 in the form of an aqueous suspension and/or in solid form as an extra white pigment for surface-coating of paper or as a filler in the production of pa-

per or in the production of paints and lacquers, preferably for indoor and outdoor uses.

17. Use of the products obtained in the process according to any of claims 1 to 15 as a flame-retardant filler for fire-protecting construction materials, insulating materials, mortars, wallpapers, paperboards, papers, for the production of paints and lacquers, as a filler for producing plasterboards or building slabs or as an hydraulically active additive for producing swelling cements, swelling plasters and screeds, for microfiber armation of cements and mortars or as a swelling component for the production of explosion-protected explosives.

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